CLAIMS

What is claimed is:

1. A polishing article for the electrochemical mechanical polishing (ECMP) of a workpiece, said article comprising an electrically-conductive compound which is formed into a layer, said compound comprising an admixture which comprises:

(a) a polymeric component forming a continuous phase in said layer; and

(b) an electrically-conductive filler component forming a first discrete phase within said continuous phase,

whereby, with the workpiece and the layer being electrically connected and with an electrical bias being applied between the workpiece and layer, the bias being capable of activating an electrochemical reaction, the compound exhibiting an overpotential for the activation of said reaction greater than said bias.

2. The polishing article of claim 1 wherein said overpotential is at least about 1 V.

3. The polishing article of claim 1 wherein said electrically-conductive filler component is selected from the group consisting of graphite particles, metal particles, metal-coated metal particles, metal-coated non-metal particles, and mixtures thereof.

4. The polishing article of claim 1 wherein said electrically-conductive filler component comprises graphite particles.

5. The polishing article of claim 1 wherein said electrically-conductive filler component comprises tin particles.

6. The polishing article of claim 1 wherein said polymeric component comprises a urethane polymer or copolymer.

7. The polishing article of claim 1 wherein the compound comprises, by total weight of the components (a) and (b), between about 25-95% of the electrically-conductive filler component.

8. The polishing article of claim 1 wherein the electrically-conductive filler component comprises particles having a mean average particle size of between about 0.01-10 mil (0.25-250 μm).

9. The polishing article of claim 1 wherein the compound has an electrical volume resistivity of not greater than about 1 Ω-cm.

10. The polishing article of claim 1 wherein the admixture further comprises:

(c) a resin filler component forming a second discrete phase within said continuous phase, said second discrete phase being substantially free of said electrically-conductive filler component.

11. The polishing article of claim 10 wherein the compound comprises, by total weight of the components (a), (b), and (c), between about 1-10% of the resin filler component.

12. The polishing article of claim 10 wherein the resin filler component comprises particles having a mean average particle size of between about 0.08-2 mil (2-50 μm).

13. The polishing article of claim 10 wherein said resin filler component comprises particles of one or more thermoplastic resins.

14. The polishing article of claim 1 wherein said article further comprises a carrier, said layer of said electrically-conductive compound being supported on said carrier.

15. The polishing article of claim 14 wherein said carrier comprises a sheet of an electrically-conductive mesh.

16. An electrochemical mechanical polishing (ECMP) system for processing a workpiece, said system comprising:

a polishing article electrically connected to the workpiece, the article comprising an electrically-conductive compound which is formed into a layer, said compound comprising an admixture which comprises:

(a) a polymeric component forming a continuous phase in said layer; and

(b) an electrically-conductive filler component forming a first discrete phase within said continuous phase,

a workpiece electrically connected to the layer; and

an electrical bias applied between the workpiece and the layer,

whereby, with the electrical bias applied between the workpiece and the layer being capable of activating an electrochemical reaction, the compound exhibiting an overpotential for the activation of said reaction greater than said bias.

17. The ECMP system of claim 16 wherein the layer has a processing surface and the workpiece has a workpiece surface disposed against the processing surface of the layer.

18. The ECMP system of claim 16 wherein said overpotential is at least about 1 V.

19. The ECMP system of claim 16 wherein said electrically-conductive filler component is selected from the group consisting of graphite particles, metal particles, metal-coated metal particles, metal-coated non-metal particles, and mixtures thereof.

20. The ECMP system of claim 16 wherein said electrically-conductive filler component comprises graphite particles.

21. The ECMP system of claim 16 wherein said electrically-conductive filler component comprises tin particles.

22. The ECMP system of claim 16 wherein said polymeric component comprises a urethane polymer or copolymer.

23. The ECMP system of claim 16 wherein the compound comprises, by total weight of the components (a) and (b), between about 25-95% of the electrically-conductive filler component.

24. The ECMP system of claim 16 wherein the electrically-conductive filler component comprises particles having a mean average particle size of between about 0.01-10 mil (0.25-250 μm).

25. The ECMP system of claim 16 wherein the compound has an electrical volume resistivity of not greater than about 1 Ω-cm.

26. The ECMP system of claim 16 wherein the admixture further comprises:

(c) a resin filler component forming a second discrete phase within said continuous phase, said second discrete phase being substantially free of said electrically-conductive filler component.

27. The ECMP system of claim 26 wherein the compound comprises, by total weight of the components (a), (b), and (c), between about 1-10% of the resin filler component.

28. The ECMP system of claim 26 wherein the resin filler component comprises particles having a mean average particle size of between about 0.08-2 mil (2-50 μm).

29. The ECMP system of claim 26 wherein said resin filler component comprises particles of one or more thermoplastic resins.

30. The ECMP system of claim 16 wherein said article further comprises a carrier, said layer of said electrically-conductive compound being supported on said carrier.

31. The ECMP system of claim 30 wherein said carrier comprises a sheet of an electrically-conductive mesh.

32. An electrochemical mechanical polishing (ECMP) method for processing a surface of a workpiece, said method comprising the steps of:

(a) providing a polishing article, the article comprising an electrically-conductive compound which is formed into a layer having a processing surface, said compound comprising an admixture which comprises:

(I) a polymeric component forming a continuous phase in said layer; and

(II) an electrically-conductive filler component forming a first discrete phase within said continuous phase,

(b) electrically connecting the layer of step (a) to the workpiece; and

(c) applying an electrical bias between the workpiece and the layer, the bias being capable of activating an electrochemical reaction, and the compound of the layer exhibiting an overpotential for the activation of said reaction greater than said bias.

33. The ECMP method of claim 32 wherein the layer of step (a) has a processing surface, and wherein the method further comprising the additional step following step (a) of:

disposing the surface of the workpiece against the processing surface of the layer.

34. The ECMP method of claim 33 wherein said overpotential is at least about 1 V.

35. The ECMP method of claim 33 wherein said electrically-conductive filler component is selected from the group consisting of graphite particles, metal particles, metal-coated metal particles, metal-coated non-metal particles, and mixtures thereof.

36. The ECMP method of claim 33 wherein said electrically-conductive filler component comprises graphite particles.

37. The ECMP method of claim 33 wherein said electrically-conductive filler component comprises tin particles.

38. The ECMP method of claim 33 wherein said polymeric component comprises a urethane polymer or copolymer.

39. The ECMP method of claim 33 wherein the compound comprises, by total weight of the components (I) and (II), between about 25-95% of the electrically-conductive filler component.

40. The ECMP method of claim 33 wherein the electrically-conductive filler component comprises particles having a mean average particle size of between about 0.01-10 mil (0.25-250 μm).

41. The ECMP method of claim 33 wherein the compound has an electrical volume resistivity of not greater than about 1 Ω-cm.

42. The ECMP method of claim 33 wherein the admixture further comprises:

(III) a resin filler component forming a second discrete phase within said continuous phase, said second discrete phase being substantially free of said electrically-conductive filler component.

43. The ECMP method of claim 42 wherein the compound comprises, by total weight of the components (I), (II), and (III), between about 1-10% of the resin filler component.

44. The ECMP method of claim 42 wherein the resin filler component comprises particles having a mean average particle size of between about 0.08-2 mil (2-50 μm).

45. The ECMP method of claim 42 wherein said resin filler component comprises particles of one or more thermoplastic resins.

46. The ECMP method of claim 33 wherein said article further comprises a carrier, said layer of said electrically-conductive compound being supported on said carrier.

47. The ECMP method of claim 46 wherein said carrier comprises a sheet of an electrically-conductive mesh.